Beyond Bigfoot
Searching for Hidden Animals: An Inquiry into Zoological Mysteries by Roy P. MacKal
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In chapter four, the dynamic aspects of selection are reviewed. In this chapter, Charlesworth shows that the genotypic intrinsic rate of increase plays a role similar to viability in discrete single generation models. These results are derived assuming that selection is weak. Only a few special cases have been analyzed for strong selection. It is possible that new phenomena will arise in models with strong selection. This area is clearly in need of additional research.

The last chapter answers the question: so what? The theory of the previous chapters is applied to modeling the evolution of senescence and optimal life histories. Implicit assumptions of these theories are discussed, and there is a good review of alternative theories that explain the same phenomena. Those less interested in mathematical details will find the discussion in this chapter most useful.

Charlesworth is to be congratulated for his efforts to provide verbal explanations of the assumptions and conclusions of the models. Consequently, a good deal of this book should be accessible to those lacking well developed mathematical skills.

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BEYOND BIGFOOT

Searching for Hidden Animals: An Inquiry into Zoological Mysteries, by Roy P. Mackal. Doubleday & Company, Inc., New York, 1980, 294 p., illus., $12.95 (79-6599).

Mackal has written a book that barely skirts the outer fringes of science. He is a "cryptozoologist" interested in seeking "unknown" organisms. His quary are *not* the run-of-the-mill new species of plants and animals that evolutionary biologists routinely seek by collection, identification, and refined reexamination of museum specimens. Mackal seems to identify his by examining legend, folk-lore, and newspaper reports of mysterious sightings—in effect from anecdotes. He also enjoys speculating about the survival of such attractive, but extinct, animals as pterodactyls and the dodo. His quary are "large" and mostly "monstrous." Those features, at least, seem to be necessary to have sufficient popular appeal to be the stuff of legend and of this book. I am reminded of the Sunday supplement stories of the popular newspapers of the '20s and '30s, though Mackal's style is slightly more refined.

Mackal tells a series of good monster stories and then encourages us to believe that each is worth checking out. He often reassures us (in a way that reminds me of the small print warnings of cigarette ads) that we might find *something* of value even if the monsters are imaginary. The down-to-earth, restrained comments are often restricted to a paragraph or even a single sentence late in the text of a given chapter.

Among the organisms he calls to our attention are "marine apes," living zeuglodons (ancestors of living whales which he suggests survive in Arctic seas, in many Canadian lakes, and in Lake Champlain but not, he argues with conviction, in Loch Ness), living pterodactyls and dinosaurs in Africa, gigantic, amphibious "lizards" in the Himalayas, surviving giant birds in Madagascar, Indian Ocean islands, and New Zealand, living trilobites, and best of all, man-eating plants. I particularly enjoyed the 21-page chapter on the man-eating plants, to all appearances serious in its presentation. In honesty, parts of two pages *are* spent reassuring us that such trees are unlikely to exist.

What can one say? There indeed must be some large plants and animals left to be discovered in some poorly explored parts of the globe. Presumably we will, in time, discover them. Meanwhile, there are far more important systematic challenges to evolutionary biologists and far more important uses for large expenditures of time, money, and talent than seeking "marine apes" in the Aleutians, elephant seals in the lakes of Arkansas, or zeuglodons in New York. The book is alternatingly enjoyable as science fiction and seriously irritating as science.

What can Mackal's motivation be? I fear that he hopes to gain support for the work of "cryptozoologists" around the world pursuing their elusive monsters—an explosion, perhaps, of Loch Ness "expeditions." What a misfortune that would be for science, but I believe we must expect such phenomena to occur regularly as a reflection of mankind's anxiety in the modern world of science and an obvious extension of current interest in the paranormal.

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LIMITED APPROACH TO BEHAVIOR

Animal Behaviour: A Systems Approach, by Frederick Toates. John Wiley and Sons, New York, 1980, 299 p., illus., $50.00 (79-41485).

The author states that he "originally wanted to put 'Motivation' in the title," and he should have, for the book is really about endogeneous factors of control in selected behavior. Because the text puts forth "tentative models of hunger, thirst, sex, and behavioural temperature control," the author states, "I do not feel I am cheating in the title of the book," but I find it hard to agree. Whatever the study of animal behavior is taken to be, surely it also includes locomotion, maintenance activities, migration, territoriality, parental care, hibernation, dominance, communication, and a host of other topics totally missing from this volume.

The approach is one of systems analysis, that branch of cybernetics dealing with complex systems of control involving feedback. Systems analysis developed during World War II when the concepts of Norbert Wiener and others were applied to military problems such as how to insure that a projectile intersected a rapidly moving enemy aircraft. The original development utilized higher mathematics of linear engineering systems; Toates wisely avoids these specialized mathematics in striving for a simple explanation of control concepts.

The text is generally quite clearly written, in part because the author takes the leisure to move slowly without skipping steps in the logic on which the reader might stumble. Despite this care, I find the conceptual material of the first three chapters wanting. I think the reader will not understand that identification and labeling of components depend upon how the system itself is defined. Truly critical concepts, such as feedback and parameter, (which has a special meaning in systems analysis) are introduced by way of example, but never explicitly defined for general use. Although the viewpoint of "black-box" analysis is amply documented, the reader is given no general principles for modeling complex systems.

Biologists will feel a bit uneasy when reading the later chapters on specific systems. Perhaps psychology students will believe that the digestive tract of animals consists of the mouth, oesophagus, stomach, duodenum, etc., but any student who has taken introductory biology will recognize the anthropocentric outlook of the text. The chapter on temperature regulation is more manifestly comparative and, hence, general, but the book as a whole is about the white rat. The text (p. 245) berates ethologists (with some justification) for not emphasizing sleep in their textbooks, but sleep is difficult to define in animals other than mammals and birds, and many organisms (e.g., many fishes) never engage in anything remotely resembling sleep.

If one recognizes this text for what it really is—the application of systems analysis to selected topics of physiologically related behavior in a few well-studied animals of the laboratory—it is a competent and useful contribution to its special area. For many biologists, I fear, it is bedtime reading for those occasional nights of nearly incurable insomnia.

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